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1: *Clin Biochem* 2000 Mar;33(2):131-8

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Toxic and essential elements in placentas of Swedish women.

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OBJECTIVES: To evaluate interactions between toxic and essential elements in the mother-fetus relationship and possible predictors of trace element concentrations in placenta and cord blood. **DESIGN AND METHODS:** A group of 106 Swedish women was investigated for concentrations of cadmium, lead, and several essential elements in placenta as well as cadmium, lead, zinc, and selenium in venous blood collected at gestational week (gw) 36 and umbilical cord blood. Relations between these elements and maternal and child's characteristics were examined. **RESULTS:** The concentrations of cadmium in placenta ranged from 10 to 170 nmol/kg, with the median value (Md) being 46 nmol/kg. Cord blood cadmium (Md of 0.19 nmol/L) was only about 10% of that in maternal blood. Smokers had significantly higher cadmium concentrations in blood ($p < 0.001$) and placenta ($p = 0.001$) than non-smokers. The median placental concentration of lead was 26 nmol/kg (range 0-630 nmol/kg). The lead levels in cord blood (Md of 54 nmol/L) were almost the same as in maternal blood. Statistically significant negative associations were found between cord blood lead, on one hand, and child's weight, length, and head circumference, on the other. The placental levels (medians and ranges) of the essential elements (micromol/kg) were 160 (120-280) for zinc, 2.4 (2.0-3.3) for selenium, 15 (10-20) for copper, 0.084 (0.02-0.32) for cobalt, 0.055 (0.03-0.12) for molybdenum, and 1.2 (0.65-5.1) for manganese, respectively. Several of the essential elements in placenta correlated significantly with each other. Multiparous mothers had significantly lower concentrations of zinc ($p = 0.002$) and selenium ($p = 0.049$) in serum as well as zinc ($p = 0.001$) and calcium ($p = 0.004$) in placenta than nulliparous ones. Also, cord blood zinc decreased with parity.

CONCLUSIONS: The results showed that lead, but not cadmium crossed easily the placental barrier. There were no negative effects of cadmium on the zinc status. Cord blood lead, on the other hand, was a negative predictor of child's birth weight, length and head circumference, indicating that lead might have negative influence on growth in children even at very low exposure levels. There was a depletion of maternal stores of essential elements with increasing parity.

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